

- There are several age readers for each stock/species and bilateral agreements exist with age readers at other institutes who read CS from the same stock/species. CS preparation and age reading procedures and manuals exist for all stocks/species. Reference collections are used for each stock/species and these are updated at intervals with new CS, to reduce the possibility of unintentional bias caused by too frequent exposure to the same CS or (CS image). There are regular scheduled exercises to monitor changes in the age reader performance. There are specified training programmes that require the trainee to be closely supervised for a period of time, before they can enter the cycle of quality management for age readers who contribute data to assessments. A quality manual exists and this defines how reference collections are managed, how training programmes are managed and how quality checks and controls are carried out. The age readers take part in all relevant age calibration exchanges (EX) and age calibration workshops (WKAC). This is the most preferable level of internal quality management. Original CS are catalogued and stored in a way that will prevent damage, loss or deterioration. The reference collections are managed using an image database (N.B. WebGR can be installed locally for this purpose). The management of all documents is controlled and is properly managed, typically by means of an electronic document repository. Unauthorised changes to quality documents are not permitted and printed versions will be watermarked as uncontrolled documents. It is likely that Institutes that meet these requirements may have, or be capable of obtaining quality management certification, e.g. ISO 9001: 2008 and ISO 17025 (accreditation).

7.2 External Quality Management

Accreditation is the highest level of external quality management and two MS institutes currently hold national accreditation, CEFAS (ISO 17025 - UKAS) and IVLO (ISO 17025 - BELAC).

7.3 Study on Harmonised methodology of age estimation Procedures

Most of European fish stocks are assessed using age-based models. In this context, the quality of these data plays a vital role in management of fish resources. Errors in age estimation can be caused by accuracy and/or precision issues (Campana, 2001) and they have to be detected and quantified. Accuracy refers to the closeness between measurements and their true value. Precision is defined as the variability in the age readings. Within and between age reading laboratories there will inevitably be disagreements between age readers.

The European Commission supported the development of a European Fish Ageing Network with two Concerted Actions, i.e. EFAN (European Fish Aging Network) and TACADAR (Towards Accreditation and Certification of Age Determination of Aquatic Resources) from 1997 to 2006. The overall theme of both CAs was to harmonise the fish age estimation, mostly carried out by interpreting calcified structures.

Since 2006, the ICES Planning Group on Commercial Catch, Discards and Biological Sampling (PGCCDBS) organises each year of calibration exercises and workshops on calcified structures to estimate precision and relative/absolute bias in the age estimations from readers based in different ageing laboratories.

In 2007, the PGCCDBS meeting decided to produce the first international age length key (ALK) for the sole in the Eastern English Channel (ICES area VIIId) in 2008. In the future, the international ALK should develop requiring the harmonisation of the age estimation procedures.

Proposition:

The objective for this proposal is to develop a harmonised methodology and quality assurance process for age estimation procedures for a small region with a group of countries, before trying to achieve general harmonisation of these procedures for all ICES areas. Firstly, we need to identify the region and common species/stocks to be used in this trial harmonisation. The techniques for each step from sampling of the calcified pieces to the storage/archiving then need to be described and compared per country and per species/stocks. Common tools for quality indication and assurance need to be developed for each step of the age estimation procedure. The most qualitative procedures will then be used for optimisation and harmonisation of the protocols (methods of preparation, material etc.) per species/stock and among species/stocks. This will then result in a harmonised quality control mechanism and the development of guidelines for good techniques and good operating procedures. According to these harmonised protocols, we will also need to develop consistent training for new age readers (per species/stock). These new sets of harmonised protocols will give more strength for accreditation processes and will strengthen already accredited labs.

This study was presented during the Regional Coordination Meeting for the North Atlantic (RCM NA) 2010 and during the ICES Planning Group on Commercial Catch, Discards and Biological Sampling (PGCCDBS) 2011 meeting.

WKNARC is supporting the idea of this study with a small number of case studies.

7.4 Proposal for the use of a standard grading system by age readers of their own readings to register the confidence level the reader has in their otolith readings, reflecting the quality of the data.

PGCCDBS recommends the use of a standard grading system by the mackerel age reader of his/her own readings (e.g. high, medium, low) be considered during the WKNARC as a standard that could be applied in all age calibration ex-changes and/or WKs (ref. WKARMAC 2010).

It is a recommendation of the WKARMAC 2010 Workshop to register the confidence level the reader has in their otolith reading, reflecting the quality of the data. Most readers should use a scale of 3 levels of quality:

- Rings can be counted with certainty: 1
- Rings can be counted, but with difficulty and some doubt: 2
- Rings cannot be counted, the otolith is unreadable: 3

WKNARC supports the PGCCDBS recommendation for the use of a grading system by the age reader of their own readings in all age calibration exchanges and/or WKs.

Reading the ages of calcified structures is a subjective process, where the reader uses their acquired knowledge of CS growth zone patterns and the biology of a species-stock, to estimate the age of individual CS that are believed to be from that species-stock. Typically, age readers who provide the age data that are used in stock assessments are experienced in reading the CS of the species-stocks studied at their institutes. Several different scales of different lengths have been used at MS institutes and